

WHAT IS CLAIMED IS:

1. A method of fabricating an optical element comprising:
depositing a multi-layer stack comprising alternating layers of first and second materials on a surface of a substrate wherein the two materials are selected to provide relative etch selectivity;
forming a resist layer on top of the stack;
patterning the resist layer and developing said resist layer to uncover one or more regions of the stack;
plasma etching said one or more uncovered regions of the stack to remove at least part of one layer of the stack to form a relief profile; and
depositing a film on the relief profile.
2. A method according to claim 1, wherein after the etching, remaining resist is removed and the forming, patterning and etching are repeated a plurality of times before the depositing.
3. A method according to claim 1, wherein the optical element is a fresnel type lens.
4. A method according to claim 1, wherein the film is a reflecting film.
5. A method according to claim 4, wherein the reflecting film is selected from the group consisting of a Bragg reflector and a protective layer.
6. A lithographic projection apparatus comprising:
a radiation system for providing a projection beam of radiation;
a support structure for supporting patterning structure, the patterning structure adapted to pattern the projection beam according to a desired pattern;
a substrate table for holding a substrate;
a projection system that projects the patterned beam onto a target portion of the substrate; and
an optical element fabricated by a method according to claim 1 operationally associated with at least one of the radiation system and the projection system.

7. An optical element comprising:
a multi-layer stack having alternating layers of first and second materials, and being plasma etched to form a diffraction pattern defined by a relief profile; and
a film on the relief profile,
wherein the relief profile has at least one wall that forms an angle of more than 90° with an adjacent floor.
8. An element as in claim 7, wherein the film is a reflective multilayer stack.
9. An element as in claim 8, wherein the stack comprises molybdenum and one of silicon and beryllium.
10. An element as in claim 7, wherein the first material is Si and the second layer is SiO₂.